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ABSTRACT

The major objective of this study was to evaluate the effectiveness of the skill-based Wisconsin Design Word Attack (WDWA) system with severely disabled readers, by comparing a phonetic patterns approach, basal-only approach, and a basal approach combined with the WDWA system. The questions were whether achievement on decoding words in isolation (as measured by the Wide Range Achievement Test) would differ significantly among these three groups and whether subjects (aged seven through twelve) could apply and retain learned skills. Results indicated that there were significant differences in achievement for reading words in isolation, in favor of the group using the basal approach combined with the WDWA system. Other results indicated that this group made greater increases in context reading and that they retained nearly all of the skills mastered. Results also suggested that revisions in the Wisconsin Design resource file might increase its effectiveness with disabled readers and improve its utility in special classrooms. Revision needs, based on classroom observations and teacher interviews, are outlined. (Author/JM)

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EVALUATION OF A SKILL-BASED WORD ATTACK SYSTEM WITH DISABLED READERS

Skill-based reading systems feature a test-teach-test model which may assist resource teachers in planning and implementing individualized instruction for disabled readers. Several of the major word attack systems have been analyzed by Rude (1974). His data suggests that special attributes of the Wisconsin Design for Reading Skills Development: Word Attack (WDWA) (Otto & Askov, 1972) might make it appropriate for use with disabled learners (LD's). Two studies indicate that the WDWA has been used successfully with disabled learners (Morsink et al., in press) and educable mentally retarded students (Rozencranz, 1973). However, since control groups were not used in either case, there is a need for further study. Further study of the WDWA is also indicated because the complexity of learning disabilities suggests that materials designed for normal learners may need adaptation for LDs (Morsink, 1977).

This report summarizes the results of a year-long controlled study in which the WDWA provided supplementary instruction for students (Ss) in ten LD classes in a large central Kentucky school district. The major objective was to compare the basal plus WDWA system with two other methods of reading instruction which previously demonstrated effectiveness in these classes. A secondary objective was to document revision needs which might increase the effectiveness of the WDWA with LDs or improve its utility in special classrooms.

The research questions were as follows: (1) Would post-test achievement on decoding words in isolation differ significantly (.05), among the groups?; (2) Would there be differences among the groups in their rate of reading words accurately in context?; (3) Would Ss in the experimental group retain learned skills after the passage of time and the intervention of other instruction?;

(4) Does the Wisconsin Design Word Attack system need revision prior to its recommended use with severely disabled readers?

Procedures

Sample. All subjects were seven-through-twelve-year-old LD's (state guidelines) with extreme difficulty in word attack. These Ss were assigned to one of three treatments for word attack instruction. Data on the characteristics of the fifty-three Ss who had been both randomly assigned and whose placements were accepted by teachers are presented in Table 1. Each teacher had four to nine of these Ss and all ten teachers taught both experimental and control Ss in all three treatments.

Insert Table 1

It is evident from Table 1 that students in the three treatments were not equivalent in age or pre-test achievement. It should be emphasized that the study was conceptualized as a real world evaluation rather than a piece of laboratory research. In structured interviews, teachers reported approving experimental assignments for students only when they agreed that the student's random placement offered him the best prognosis for success.

Further explanation of group differences is perhaps in order. The "basal only" group was composed of students who had, according to teachers, made the best comparative progress in basal readers, while "patterns" and "basal/WDWA" consisted of those whose previous failure in basals seemed to indicate the need for word attack programs emphasizing more systematic skills instruction.

Data collection and instrumentation. Ss's ability to decode words in isolation was assessed by the Wide Range Achievement Test, Reading Subtest (WRAT-R, Jastak & Jastak, 1965). It was administered as a pre-test in September and as a post-test in January and May.

Ss's reading in context was measured in basals at their instructional level, using an increase in rate with a word attack accuracy level of 90%+ as the criterion for improvement. Student teachers collected this data by finding, for each child, the weekly averages of words correct per minute (WCPM), errors per minute (EPM), and percent correct. These numbers were averaged from three randomly selected one-minute samples of the child's oral reading and were plotted on graphs.

Retention of learned skills was measured for the basal/WDWA group only, by re-administration in May, of the alternate form of the CR tests over all skills each S had mastered. Revision needs were documented in structured interviews with teachers plus a total of one hundred ninety-four hours of direct classroom observations by the experimenter.

Treatments

All Ss in basal only and basal/WDWA groups were placed in a basal at instructional level (Johnson & Kress, 1965) for reading instruction. Across both groups the basals were essentially the same, with over half of the Ss in each group initially placed in Houghton-Mifflin (Durr, La Pere & Niehaus, 1974). There were small numbers in five other traditional basals and frequent changes in basal series were made in both groups throughout the experiment. Thirteen of the eighteen Ss in the patterns group used Programmed Reading (Sullivan & Buchanan, 1963) as their "basal" reader, while others used either the Merrill Linguistic (Fries et al., 1966) or the SRA Basic (Rasmussen & Goldberg, 1964) readers.

Basal only: Control 1. Ss read in basals at instructional level, with teachers following the word attack and comprehension sequences in the teacher's manuals. Reading instruction was individualized, with teachers introducing new vocabulary, presenting word attack and comprehension skills, and listening to the child read orally. Individual supplementary workbooks and worksheets were used if needed, as suggested by the teacher's manual. This treatment differed from the experimental (basal/WDWA) in two ways: it presented word attack instruction which correlated with the sequence established by the basal reader rather than the WDWA, and it used no formal system of skills assessment.

Patterns: Control 2. Ss read in programmed or phonetic patterns readers at instructional level, with teachers introducing new vocabulary and presenting comprehension skills. Direct instruction on patterns (for example an in "man, pan, can") was given to Ss in small groups about three times a week for 20-30 minutes, using the READ materials (Morsink, 1972). Follow-up practice on patterns was provided through the READ bingo games, the SRA Tutortapes (DeRoot, 1972), and teacher-made activities. This treatment differed from the experimental (basal/WDWA) in two ways: it featured word attack instruction based entirely on phonetically regular words, and it used no formal system of skills assessment.

Basal/WDWA: Experimental. Students read in basals at instructional level, with teachers introducing new vocabulary and presenting comprehension skills from the manuals. The WDWA was used as a supplementary system for measurement, instruction, and records management of the word attack component of the program. The WDWA provided a series of CR skill tests matching a teacher's resource file which included suggested teaching activities and lists of paginated published materials for teaching the skills. WDWA files,

supplemented as necessary by teacher-made materials, were the source of instructional activities for skill groups. Skill groups met approximately three times a week for 20-30 minutes each. Records of skills each child had mastered (80%+) and those on which he needed instruction were kept on individual profile cards. The supplementary provision of systematic word attack instruction keyed to individual's needs was the unique attribute of the experimental treatment.

Results

Decoding Words in Isolation. Because an analysis of variance confirmed the "quasi-experimental" nature of the design with a p-value of .0022 for the WRAT-R pre-test across the three treatments, an analysis of covariance was performed on the January post-test WRAT-R grade level scores, using the September pre-test as the covariate (Campbell & Stanley, 1963). The results of this analysis, presented in Table 2, suggested that treatments were significantly different.

Insert Table 2

Adjusting the January means by the pre-tests, the basal/WDWA group had a grade level mean of 3.05 followed by the basal mean of 2.69. The adjusted mean for patterns was 2.47.

Although the experiment continued for an entire school year, teachers reached the unanimous decision to terminate the basal only treatment in January, (see discussion). Also, because of maternity leave, one teacher with her four Ss was dropped. Another child moved, reducing the total January-May N to 32 (16 each in basal/WDWA and patterns).

A second analysis of covariance was performed on the WRAT-R post-test grade level scores collected in May, covarying on the September pre-test. These results indicate that there was again a significant difference ($p = .0056$) between the year's end grade level means for words in isolation, when the scores were adjusted for the effects of the September pre-test. The basal/WDWA had an adjusted mean of 3.33 while the patterns group had an adjusted mean of 2.53.

The nature of the grade equivalency scores for the WRAT-R is displayed in Figure 1.

Insert Figure 1

This figure shows that the greatest growth took place in the basal/WDWA group and also that the patterns group had the lowest level of overall achievement.

Reading in Context. Comparison of Ss's ability to apply learned skills to the reading of words in context are displayed in Figure 2. These data points represent the group averages of individual graphs for words correct per minute.

Insert Figure 2

This figure shows that data on ability to read words correctly in context was consistent with the form of the data on decoding words in isolation. Again, the basal/WDWA treatment was superior. The figure also shows a slow but pronounced increase in context reading for "patterns" during the second semester.

Retention of Skills. The results of the WDWA tests for the 16 Ss who were in the Basal/WDWA group for the entire year are presented in Table 3.

Insert Table 3

This table indicates that in 15/16 cases, the LD Ss had retained all or all but one of the WDWA skills learned.

Discussion

Basal Only. Data suggested that this group was the least severely disabled. It was also the only group for whom reading instruction was completely individualized. The basal only group should have then - but did not - make the greatest progress either on words in isolation or in context. Lower rates of WCPM (Figure 2) also confirmed teacher's reports that this approach intensified Ss's tendency to guess at words. Teacher's concerns about the lack of systematic, monitored WA skill development were evidenced by their repeated requests to be allowed to add the WDWA to the treatment for basal only Ss.

For experimental purposes, termination of this treatment in January was unfortunate. However, the observations by teachers and a small amount of objective data suggested tentatively that basal only was less effective for LD's than the other two approaches. This requires validation with larger numbers over a longer period of time.

Patterns. Minimal growth for this group on words in isolation might be attributed to the small number of patterned words on the WRAT-R test and/or to the low Ss's need for longer intervention (Ferinden, VanHandel, & Kovalinsky, 1971). Patterns Ss's ability in oral context reading began slowly and unevenly, then began to accelerate during the second semester. It should be noted that context reading featured "patterned" words and therefore provided a more direct measure of skill application than did the WRAT-R.

It should also be noted that seven of the sixteen patterns Ss who were almost nonreaders in September had mastered "regular" short vowel pattern words by mid-March. At the end of the year, these students were able to transfer successfully to the basal plus skills approach. In this study, then, a beginning word attack program with predictable sound/symbol relationships and a lot of overlearning, followed by a skill-supported transition to more conventional materials, was effective for some LD Ss even at the lowest levels. It is not known whether these same students would have made comparable progress if they had been placed in the basal/WDWA treatment from the beginning.

Basal/WDWA. This group's oral reading performance, both in isolation and in context, was superior to that of groups in the other two programs. Even though the largest number of severely disabled readers were in "patterns", basal/WDWA also contained two Ss who were described in September as total non-readers. It may be significant to note that both of these Ss were reading in a primer at 34-44 WCPM by May, and that the Figure 2 drop in context reading during week 26 was due in part to their addition to the graph. The group's second semester leveling in reading achievement (Figures 1 & 2) may also be significant if it can be interpreted as reflecting the need for LD Ss to stabilize after an initial period of skills acquisition.

Retention of skills was excellent (Table 3), though mastery was slow. In no case did a LD student acquire more than seven skills during the year. This may mean that LD's require a minimum of four to five weeks of instruction for skill mastery, as opposed to the recommended two to three for normal learners. It may also indicate a need for more activities in the WDWA resource file.

Revision Needs. The data in Table 3 indicated that basal/WDWA students taught by different teachers varied greatly in the number of skills they acquired and retained. Data collected during structured interviews suggested that teachers who used the WDWA system most successfully spend a large amount of time preparing their own skill lessons and activities. Teachers commented that the resource file was the WDWA component in need of revision, since it included an inadequate number of suggested teaching activities and because some activities were not appropriate for LD Ss. Teachers suggested that the revised file should include more activities for overlearning of skills, with a finer task analysis in a more carefully structured sequence, and that it should give more specific teaching instructions.

Additional data gathered during classroom observations indicated that the successful WDWA teachers were able to design and implement their own teaching activities which matched students' skill needs. However, the unsuccessful teachers often presented activities which had a questionable relationship to their lesson objective, while they failed to provide the practice necessary for mastery of the skill, and they did not give students consistent positive verbal feedback.

Information gathered during these interviews and observations might be synthesized into a recommendation that the revised teaching activities for any given skill take the form of a "teaching sequence" similar to that presented in Figure 3.

Insert Figure 3

Each subsequent step in the sequence would build on previously mastered material

and provisions for helping students to apply learned skills to contextual materials should be included.

Summary and Recommendations

In this study, the basal/WDWA approach, when supplemented by teacher-designed lessons, was superior to either the basal only or the patterns approach in enabling the majority of LD Ss to increase their word attack skills in isolation and in context. It was also effective in enabling Ss to retain selected word attack skills. Because numbers were small, some measurement techniques experimental, and sampling problems evident, however, the conclusions should be regarded as tentative and further studies should be conducted.

Classroom observations and teacher feedback suggested that the WDWA resource files were probably not adequate in their present form for the most severely disabled readers.* Following revision, the Wisconsin Design Word Attack program should be tested again to evaluate its effectiveness as a management/measurement system, and also as a supplement to prescriptive instruction for disabled readers.

*A new Wisconsin Design Word Attack Teacher's Resource File, adapted for disabled readers, is now in press.

TABLE 1

Description of Sample by Experimental Group

(N=53)

	Patterns	Basal only	Basal/WDWA
Age (Months)			
Mean	113.00	113.88	118.53
S.D.	11.45	12.91	11.45
Range	84-132	94-146	100-142
WRAT-Reading (September)			
Mean	1.73	2.41	2.36
S.D.	.33	.71	.68
Range	1.0-2.1	1.3-3.8	1.2-3.5
Actual Grade			
Mean	3.3	3.5	3.7
Range	2-5	2-6	2-6
Sex			
Male	18	11	15
Female	0	5	4
Total N	18	16	19

TABLE 2

ANALYSIS OF COVARIANCE: JANUARY WRAT-R

Source	df	SS	MS	F	P-Value
Pre-Test	1	22.55	22.55	78.45	.0001
Treatment	2	2.71	1.35	4.52	.0156
Error	49	14.71	.30		

TABLE 3

Teacher Means for Mastery & Retention of Skills for Basal/WDWA

Teacher	Pretest Mastery	Mastery (Instruction)	Retention Loss	Year's Total
1	7	3.5	0	10.5
2	9	3	0	12
3	7	1	0	8
4	6.5	6.5	1	12
5	6	5.5	.5	11
6	8	5	.5	12.5
7	9	4	0	13
8	5.5	4.5	2	8
9	5	3	1	7

Figure 1

Grade Equivalency Means
on the WRAT-R by Treatment

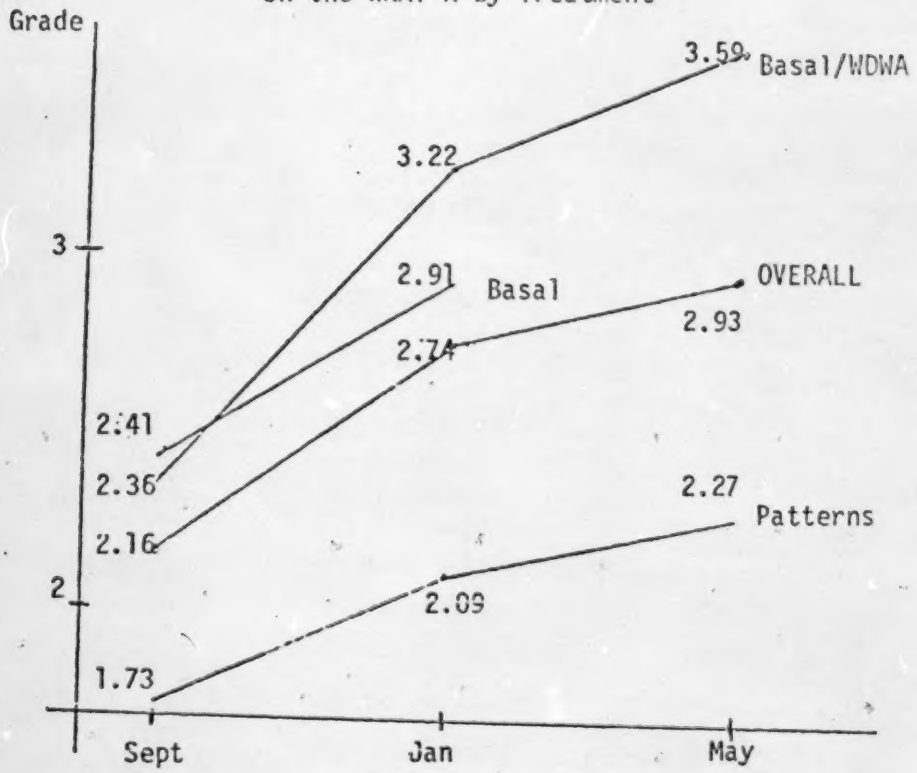

Figure 2

Oral Graphs of Three Methods
of Teaching Word Attack to LD Students

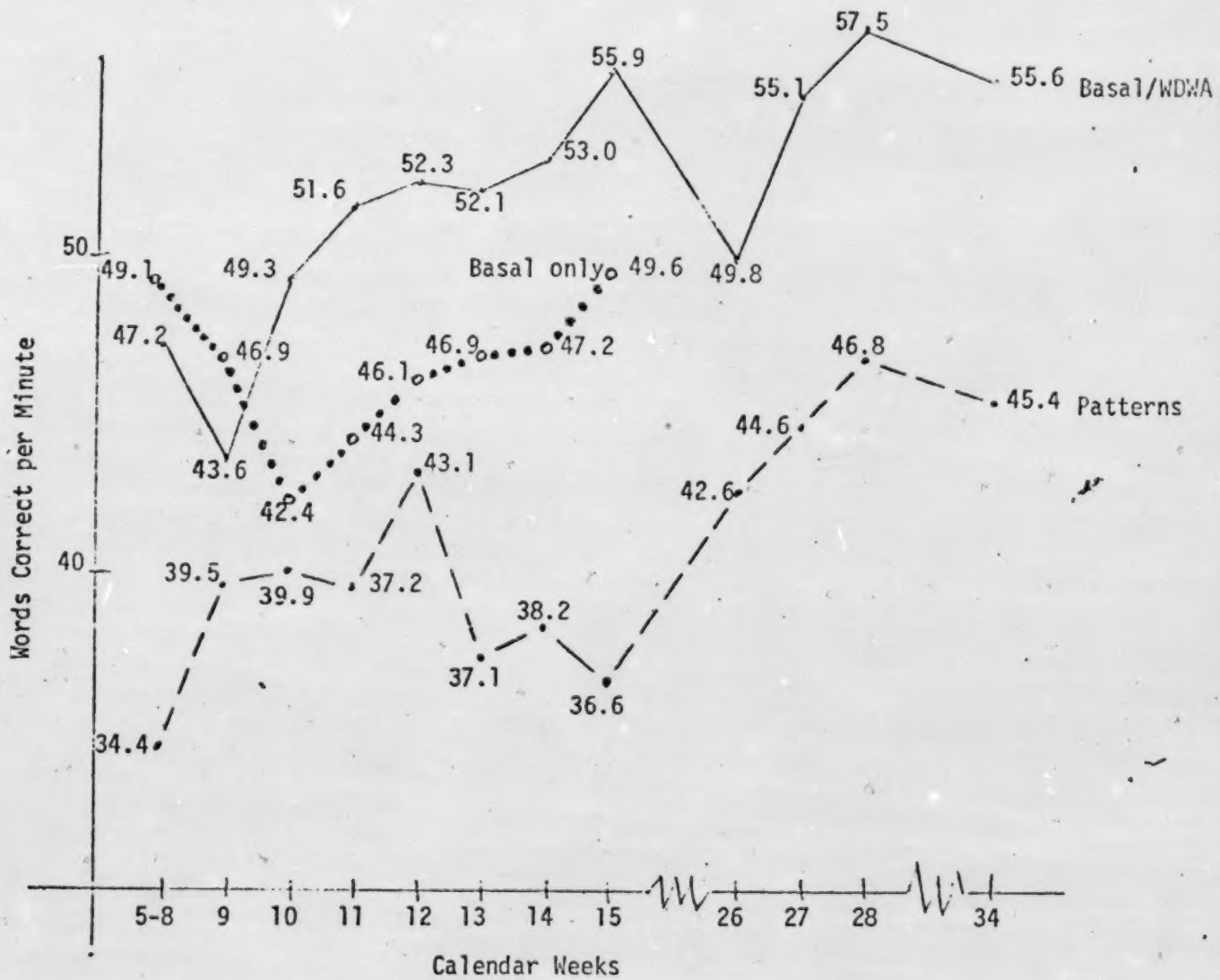

Figure 3

Suggested Sample Lesson Plan for Teaching Skill

D-2: Three-Letter Blends

WORD ATTACK	LEVEL	SKILL	STEP
	D	2	1

TEACHING SEQUENCE

MATERIALS:

Chalk, board

Prerequisites: Mastery of Skills in Levels A, B, C

1. Write the following words on the board;

   rain, rap, ring, raw, rip, ripe

   Say, "You already know these words. Raise your hand if you can read them." (Give turns and praise correct responses.)

TASK:

Recall of past learning; transfer from 2-to-3-letter blends; generalization

2. Write st on the board.

   Say, "You already know this blend. What is it?" (Praise correct response.)

3. Write st in front of rain.

   Say, "If you know this blend (point to st) and this word (point to rain) then you can read this new word. (Underline strain with your finger.) What is it?" (Praise correct response.) Repeat, using other words (st - rap, string, etc.).

MATERIALS:

Str - game cards; game-board.

4. Say, "All of these words start with the same three-letter blend. What is it?" (Praise correst response: str.)

TASK:

Overlearning

5. Play series of word games, using cards on which you have written "str" words. Use any game board or play versions of word games like "Bingo," "Go Fish," etc. Also play matching games in which students must discriminate between similar words (stain/train/strain; scrap/strap; sheet/street) then choose words with str-blend.

   (Proceed to step 2 when student demonstrates mastery of step 1.)

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